Claims

1. A light emitting device comprising:

a substrate;

a gallium nitride layer provided above the substrate;

an N-type gallium nitride layer provided above the gallium nitride layer;

at least one $In_xGa_{1-x}N/In_yGa_{1-y}N$ multi-layer ($0<x,y<1$) provided above the N-type gallium nitride layer, x being different from y; and

a P-type gallium nitride layer provided above the $In_xGa_{1-x}N/In_yGa_{1-y}N$ multi-layer.

2. The device according to claim 1, wherein the $In_xGa_{1-x}N/In_yGa_{1-y}N$ multi-layer has a plurality of pits formed thereon.

3. The device according to claim 2, wherein the number of the pits is 50 or less per area of 5㎛×5㎛.

4. The device according to claim 1, wherein each layer of the $In_xGa_{1-x}N/In_yGa_{1-y}N$ multi-layer has a thickness of 1~3000 Å.

5. The device according to claim 1, wherein the $In_xGa_{1-x}N/In_yGa_{1-y}N$ multi-layer has a photoluminescence characteristic of a yellow band intensity/N-doped GaN intensity ratio of 0.4 or below.

6. A light emitting device comprising:

a first gallium nitride layer;

a second gallium nitride layer;

an active layer formed between the first gallium nitride layer and the second gallium nitride layer; and

a multi-layer formed between the second gallium nitride layer and the active layer to intercept an applied

electrostatic discharge.

7. The device according to claim 6, wherein the multi-layer is an $In_xGa_{1-x}N/In_yGa_{1-y}N$ multi-layer ($0<x,y<1$).

8. The device according to claim 6, wherein the multi-layer has a plurality of pits formed thereon.

9. The device according to claim 6, wherein the multi-layer has a plurality of layers of different In content, the plurality of layers being alternately stacked in the multi-layer.

10. The device according to claim 6, wherein the multi-layer has a plurality of layers of different growth temperatures, the plurality of layers being alternately stacked in the multi-layer.

11. The device according to claim 6, wherein the multi-layer has two layers of different growth temperatures, the two layers being formed at 800°C and 900°C, respectively.

12. The device according to claim 6, wherein the multi-layer has a plurality of pits formed thereon, the number of the pits being 50 or less per area of $5\mu m \times 5\mu m$.

13. The device according to claim 6, wherein the multi-layer has a plurality of hexagonal pits formed thereon.

14. The device according to claim 6, wherein each layer of the multi-layer has In content of 3% or less with respect to Ga and In content.

15. The device according to claim 6, wherein each layer of the multi-layer has In content of 2% or less with respect to Ga and In content.

16. The device according to claim 6, wherein the second gallium nitride layer is an N-type GaN layer.

17. A method for manufacturing a light emitting device, the method comprising the steps of:

forming a buffer layer above a substrate;

forming an N-type gallium nitride layer above the buffer layer;

forming a multi-layer above the N-type gallium nitride layer, the multi-layer including layers of different growth temperatures;

forming an active layer above the multi-layer; and

forming a P-type gallium nitride layer above the active layer.

18. The method according to claim 17, wherein the multi-layer has a plurality of InGaN layers of different In content, the InGaN layers being alternately stacked in the multi-layer.

19. The method according to claim 17, wherein the multi-layer has a plurality of layers of different growth temperatures formed thereon, the different growth temperatures being a high temperature and a low temperature, respectively.

20. The method according to claim 19, wherein the high temperature is 900°C .

21. The method according to claim 19, wherein the low temperature is 800°C .

22. The method according to claim 17, wherein the multi-layer is formed using TMGa, TMIn, ammonium, and nitrogen.

23. The method according to claim 17, wherein each layer of the multi-layer has a thickness of 1~3000 Å.

24. The method according to claim 17, further comprising the step of forming a slow-growth gallium nitride layer above the buffer layer.

25. The method according to claim 24, further comprising the step of forming an undoped gallium nitride layer above the slow-growth gallium nitride layer.